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Seroprevalence of Brucellosis in Puerperal Cows and its Public Health Implications in Zaria. Northern Nigeria

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Abstract: The Fulani pastoralists, the largest livestock holders in Nigeria, traditionally manipulate obstetrical disorders of cows without protective clothing. This practice is fraught with the risk of exposure to brucellosis, a re-emerging zoonotic disease. This study was carried out to determine the seroprevalence of brucellosis in 167 puerperal cows in Zaria, Nigeria, in order to assess the risk of exposure of pastoralists and other animal handlers to brucellosis, in view of the above mentioned practice. Sixty seven per cent of the herds studied were seropositive for brucellosis, with a 4.5% overall seroprevalence of the disease. Thus, confirming the enzootic nature of the disease in Nigeria. The prevalence was higher in postpartum cows, thus, the period constituting a greater of risk of exposure of human handlers to the disease. It is therefore, suggested that the seroprevalence of brucellosis be investigated among the pastoralists and other animal handlers as well as in other domestic animal species in the area.

Key words: Seroprevalence, brucellosis, puerperal, cows, public, health, Zaria

INTRODUCTION

Brucellosis is a term used for infections by any member of the genus *Brucella* (Nicoletti, 1993); which are Gram-negative, facultative intracellular bacteria that affect many animal species and man (Corbel, 1997). The pathogenic species and the domestic animals considered as the natural hosts include: *B. abortus* (cattle). *B. melitensis* (goats); B. *ovis* (sheep); *B. suis* (pigs) *B. canis* (Ocholi *et al*., 2004) and B. *neotomae* (desert wood rats in the USA) (Clavareau *et al*., 1998). Four of these have moderate to significant human pathogenicity: *B. canis* (moderate pathogenicity) and *B. abortus* (moderate pathogenicity). Brucellosis is a zonoosis (WHO, 1986; Nicoletti, 1993; Maloney and Fraser, 2001) which causes heavy economic losses in livestock and poses serious human health hazards world-wide (WHO, 1986; Hamidy and Amin, 2002). It is one of the most important zonoosis in the tropics (Seifert, 1996). Economic losses associated with the disease include loss of calves, loss of milk, reduced fertility, cost of vaccines and lowered value of animals culled due to the disease (Bale, 1991).

In Nigeria, the disease is endemic (Eze, 1985) and recent studies suggest increasing trend in the prevalence of the disease (Ocholi *et al*., 2004). In the last three decades, more information has emerged on various aspects of brucellosis in Nigeria and some parts of Africa (Bale, 1991). It is increasingly, evident that brucellosis represents one of the major drawbacks to livestock production in Nigeria. The Fulani pastoralists, the greatest holders of cattle in Nigeria; traditionally manipulate obstetrical cases of their cows without protective clothing, a practice that carries with it the risk of exposure to bovine brucellosis. If this economically important segment of the Nigerian population is affected by this disease with long, debilitating and devastating impact, this will have serious economic and health implications for the country. The public health concern of the disease associated with the handling of parturition and parturition-related disorders by the pastoralists has, however, not been investigated in Nigeria. Consequently, this study was undertaken to serologically survey for brucellosis in cows during the third trimester of pregnancy and postpartum period, when these animals are most handled by the pastoralists and other animal handlers, with a view of assessing any potential risk posed to the pastoralists and other animal handlers.

MATERIALS AND METHODS

Study area: This research was undertaken in a location called Zaria in Kaduna state of northern Nigeria. It is located at latitude 11° 08”N, at an altitude of 686 m above

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sea level and lies within the guinea savanna zone. Three distinct seasons exist in the area where Zaria is located. They are the harmattan (November to February), hot (March to May) and rainy (June to October) seasons (Ayo *et al*., 1998).

Study herds: Nine settled cattle herds in Zaria and its environs (within the radius of 50 km) with the herd size varying from 14 to 315 were selected with owners' consent and used for the study. The selected herds sere studied in detail with respect to herd size and structure (types and total number of animals, sexes) as well as herd management (purpose personal in charge, housing, feeding, supplementation, watering, breeding, milking practice, weaning, nature of veterinary care and disease presentation, record keeping) using the combination of a designed questionnaire and interview with the owners.

Herd size and structure: The herd sizes ranged from 14 and 15 (average 79). The structure consisted of cows, heifers, mature bulls, young bulls and calves (females and males) all herded together except in herds 1 and 7 where the calves were separated from their dams and housed in calf pens. The animals were of Bunaji breed in herds, 3, 5, 8 and 9; Bunaji and Bunaji x Friesian breeds in herds 1, 4 and 6 and Bunaji and N'dama breed in herd 2. In herd 1, the cows were subdivided into pregnant and open herds and kept separately. In addition, sheep and goats were also kept in herds 3 and 4; only goats in herd 6 and only sheep in herds 7 and 8.

Serological analysis (Rose Bengal Plate Agglutination Test): The Rose Bengal plate agglutination test was conducted as a screening test for brucellosis in both prepartum (third trimester of pregnancy) and postpartum cows using the standard *Brucella* antigen according to the Office International des Epizooties, Manual of Standards for Diagnostic Tests and vaccines (OIE, 1996). An equal volume of serum and Rose Bengal stained antigen (0.03 mL each) was added on enamel white tiled base and mixed thoroughly to produce a circular zone. This was agitated for about 4 min at room temperature and then observed for agglutination under conditions of good lighting.

Data analysis: The seroprevalence of brucellosis was determined by dividing the number of seropositive cases by the total number of cows for each category and multiplying by 100. The seroprevalance was subjected to Odds ratio to test for statistical significant difference among breeds and parity.

Table 1: Seroprevalence of bovine brucellosis in third trimester pregnant and postpartum cows in settled cattle herds in Zaria

Herds	No. of cows examined	Herd status	No. of seropositive prepartum cows	Prevalence (%)	No. of seropositive puerperal cows	Prevalence (%)
1	81	Positive	1	1.2	0	0
2	41	Positive	1	2.4	3	7.3
3	14	Positive	0	0.0	1	7.1
4	8	Positive	0	0.0	1	13
5	5	Positive	0	0.0	1	20
6	8	Positive	0	0.0	1	13
7	5	Negative	0	0.0	0	0
8	8	Positive	0	0.0	1	13
9	6	Negative	0	0.0	0	0
Total	176		2	1.1	8	4.5

RESULTS AND DISCUSSION

Seroprevalance of bovine brucellosis: The results of a survey of bovine brucellosis in prepartum and postpartum cows are presented (Table 1). There was an overall seroprevalance of 4.50% of brucellosis in postpartum cows and 1.1% in prepartum cows. About (67%) of the herds were seropositive for bovine brucellosis. Only herds 7 and 9 were not seropositive for brucellosis. The highest seroprevalance was recorded in herd 5 (20.00%).

The study has shown an overall seroprevalance of 4.5% among puerperal cows. The overall prevalence of 4.5% is slightly lower than the figures reported by other workers in Northern Nigeria (Banerjee and Bhatty, 1970; Nuru, 1974; Bawa *et al*., 1987), but is however close to the 4% reported by Kondela (1994) in dairy cattle in Mwanza district, Tanzania. A lower seroprevalance of 0.58% for cattle in Kosovo than the figure recorded in this study has been reported (Jackson *et al.* 2004). Ocholi *et al.* (2004) have posited that there is an increasing trend in the prevalence of *Brucella* infection among livestock in Nigeria. Vaccination against brucellosis has not been done for a long while in Nigeria therefore, the seroprevalance recorded in this study could be considered to be due to natural infections. The present study, suggests that bovine brucellosis is enzootic in most herds, thus agreeing with the report of Ocholi *et al.* (2004). The study has shown that the disease may still be a major problem. The low seroprevalance detected in this study is significant in terms of future disease control programme (Jackson *et al*., 2004). Brucellosis has serious economic impact (Jackson *et al*., 2004). For instance, at 1% prevalence of bovine brucellosis, it was estimated to cost the USA livestock producers about thirty million dollars ($30,000,000.00) annually. The economic impact and public health significance of uncontrolled incidences of brucellosis in Nigerian livestock population is undoubtedly high (Ocholi *et al*., 2004).

Ajogi and Akinwunmi (2001) and Ajogi *et al.* (1998) estimated the financial costs of the disease nationally to be substantial.

The higher seroprevalance of the disease recorded in postpartum animals indicated that the period constitutes the greater risk to animal hurdlers-owners, herdsmen and veterinary personnel. It can thus, be assumed that the practice by the Fulani pastoralists of manipulating obstetrical cases of the cows without protective clothing could expose them to the disease since the genital discharges of infected animals are highly dangerous for a day or two before or during calving and a fortnight following parturition (Arthur, 1986). *Brucella* can infect even the intact skin. It is therefore, imperative that the prevalence of the disease be investigated in this population with a view of instituting control measures. Brucellosis is an occupational disease and an emerging disease and its incidence in people is likely to increase in the absence of national controls of the disease in human (Jackson *et al.*, 2004). The need for extension services directed towards teaching cattle owners the importance of keeping healthy herds and the hazards of keeping a brucellosis infected animal and the need for government to adopt a policy of control of this disease has been stressed (Kondela, 1994). On a global scale, research efforts have been often repetitive-tends to focus on the development of diagnostic rests and vaccine while epidemiological studies of the transmission pathways and risk factors for the disease that could provide valuable guidance for integrated control programme have been largely neglected (Jackson *et al.*, 2004). The result of this work fills this gap. The success of national campaigns depends on effective communication of aims and benefits and supported by financial compensation and support (Seifert, 1996).

CONCLUSION

It is concluded that bovine brucellosis continues to be an enzootic in Nigeria that requires national control strategies. The disease poses a potential risk to human health and it is imperative to investigate it especially among the animal handlers and particularly the pastoralists who indulge in the practice of manipulating obstetrical disorders of cow without protective clothing.

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